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TITLE: FORMATION METHOD FOR CAPACITY INSUTATING FILM

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ABSTRACT:

PURPOSE: To obtain a capacity insulating film which can be applied to an ultra-LSI memory as a 64 MDRAM or higher by a method wherein an Si<SB>3</SB>N<SB>4</SB> film is formed by a thermochemical reaction which uses a silane-based raw-material gas and NH<SB>3</SB> gas and, in succession, a tantalum oxide film is formed by a plasma chemical reaction which uses a halogen-based tantalum raw-material gas and N<SB>2</SB>O gas.

CONSTITUTION: The formation method of a capacity insulating film is composed of the formation process of a silicon nitride film and the formation process of a tantalum oxide film. The formation process of the silicon nitride film is a process to form the silicon nitride film by a thermochemical reaction which uses a silane-based raw-material gas and ammonia gas. The formation process of the tantalum oxide film is a process to form the tantalum

oxide film by a  
plasma chemical reaction which uses a halogen-based  
tantalum raw-material gas  
and nitrous oxide gas. For example, a silicon nitride film  
in 20 to 30 $\mu$ m;  
is formed on the surface of a wafer by a thermochemical  
reaction which uses  
monosilane gas and ammonia gas. Then, a tantalum oxide  
film is formed on the  
surface of the wafer by a plasma chemical reaction which  
uses tantalum chloride  
gas and nitrous oxide gas.

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